STONY CREEK WATERSHED MANAGEMENT PLAN

APPENDICES

Appendix - Stony Creek Steering Committee Members*

Name	Position	Organization
1. Dr. Joe Ohren	Project Director	ICARD/EMU
2. Dr. Kevin Gustavson	Technical Director	EMU/WRC
3. Janna Sebald	Environmental Quality Analyst	MDEQ Surface Water Quality Division
4. Bob Abar	Deputy Drain Commissioner	Monroe County Drain Commission
5. Cheryl Baltrip	Supervisor	Exeter Township
6. Roger Bezek	Alternative Representative	Exeter Township
7. Colleen Bellars	Environmental Services	Ypsilanti Charter Township
8. Stephen Kunselman		
9. Bob Osterhout		
10. Jan BenDor	Deputy Clerk	Pittsfield Charter Township
11. Dr. Anita Zot	Representative	
12. Felizian Myer	Representative	
13. Julie Griess	Representative	
14. Bill Dean	Supervisor	York Township
15. Helen Neill	Alternative Representative	York Township (Clerk)
16. Leo Esper	Representative	Ash Township
17. Kathy Giszczak	Representative, Clerk (2005)	Augusta Township
18. Henry Altenbernt	Alternative Representative	Exeter Township
19. Bill Manty	Alternative Representative	Exeter Township
20. Ron Hansen	Engineering Consultant	The Spicer Group (Monroe County Drain Commission)
21. Chris Neuvirth	Supervisor	London Township
22. Harry Sheehan	Environmental Manager	Washtenaw Cty. Drain Commission
23. James Spas	Supervisor (2003-2004)	Frenchtown Charter Township
24. James McDevitt	Supervisor (2005)	
25. Hedi Kaufman	Alternative Representative	Frenchtown Charter Township
26. Bob Behrendt	Engineering Manager	Frenchtown Charter Township Mannik and Smith

* Over the thirty months of the project, several different people represented local government units on the Steering Committee. Their names and affiliations are listed, although on most occasions only one representative participated in committee discussions at any given time.

Appendix - Stony Creek Technical Committee Members**

Name	Organization
Ned Birkey	MSU Extension Service, Monroe County
Robert Bricault	MSU Extension Service, Washtenaw County
Stephen Blumer	U.S. Geological Service
Marti Boote	Tilton Inc.
Scott Dierks	Ayres, Lewis
Robert Jones	Geography and Geology Department, EMU
Larry Kolopajlo	Chemistry Department, EMU
Kevin Kuehn	Biology Department, EMU
Bo Mah	Washtenaw County Planning and Environmental Services Department
Scott Miller	Department of Environmental Quality
Allison MacArthur-Ruesink	Department of Environmental Quality
Al Norwood	Monroe County Conservation District
Marlene Rogers	Monroe County Conservation District
Robert Peven	Monroe County Planning Department
Ken Reiter	Washtenaw County Road Commission
Dennis Rice	Washtenaw County Conservation District
Laura Rubin	Huron River Watershed Council
Elizabeth Riggs	Huron River Watershed Council
Jennifer Wolf	Huron River Watershed Council
Dr. William Tobler	Augusta Township, Environmentalist, Planning
Jay Williams	Tetra Tech

**** In many respects the people identified below did not literally serve as a committee; only a handful of formal committee meetings were held. Nonetheless, they each in their own contributed much to the process, by communicating by phone or email with project staff on various questions, providing feedback on draft materials such as the list of likely causes of pollutants and the table of recommended action strategies, and sharing their experience and expertise with the watershed residents who made up the Steering Committee.**

Appendix - Report on Stony Creek Watershed Sampling

Prepared by Jo A. Latimore
Huron River Watershed Council
July 29, 2004

Benthic macroinvertebrates were sampled in summer 2004 at eight sites within the Stony Creek watershed, Washtenaw and Monroe Counties, Michigan (Table 1). These samples were sent to the Huron River Watershed Council for identification to family (Table 2). Non-insects were identified to the categories used in the Michigan Department of Environmental Quality's stream invertebrate survey protocol (MDEQ 2002). Water samples, for measuring conductivity, were taken at six of the eight sites concurrently with invertebrate collections (Table 3).

Table 1. Stream sites sampled for the Stony Creek Watershed project.

Site	Stream	Location	Date Sampled
0	Paint Creek	Ellsworth Road	6/19/04
1	Paint Creek	Congress Road	6/19/04
2	Paint Creek	John C. Hart Parkway	6/19/04
3B	Paint Creek	Textile Road	6/19/04
4	Paint Creek	Rosbolt Road	6/19/04
5	Stony Creek	Whittaker and Liss Roads	6/19/04
7	Stony Creek	Timbers Road	7/1/04
9	Stony Creek	Telegraph Road	7/1/04

Table 2. Benthic macroinvertebrates collected. EPT refers to the family's inclusion in the EPT index; S denotes sensitive families.

Site	Phylum	Class	Order	Family	Count	EPT	S
0	Arthropoda	Insecta	Hemiptera	Corixidae	1		
			Odonata	Aeshnidae	4		
				Coenagrionidae	2		
				Lestidae	3		
			Coleoptera	Dytiscidae	11		
				Halipidae	4		
			Diptera	Chironomidae	20		
				Simuliidae	6		
	Annelida	Oligochaeta	-	-	7		

Table 2 (continued).

Site	Phylum	Class	Order	Family	Count	EPT	S
1	Arthropoda	Insecta	Trichoptera	Hydropsychidae	2	EPT	
			Odonata	Aeshnidae	2		
				Coenagrionidae	5		
			Coleoptera	Dytiscidae	4		
				Hydrophilidae	1		
			Diptera	Chironomidae	6		
				Dolichopodidae	2		
				Simuliidae	11		
		Crustacea	Isopoda	-	5		
	-	Mollusca	Gastropoda	Physidae	2		
	Annelida	Oligochaeta	-	-	3		
		Hirudinea	-	-	1		
2	Arthropoda	Insecta	Hemiptera	Gerridae	2		
			Trichoptera	Hydropsychidae	8	EPT	
			Odonata	Aeshnidae	1		
				Calopterygidae	3		
				Coenagrionidae	1		
			Diptera	Chironomidae	16		
				Simuliidae	8		
		Crustacea	Isopoda	-	8		
	-	Mollusca	Gastropoda	Physidae	2		
	Annelida	Oligochaeta	-	-	4		
3B	Arthropoda	Insecta	Ephemeroptera	Baetidae	1	EPT	
			Trichoptera	Brachycentridae	2	EPT	S
				Hydropsychidae	3	EPT	
				Philopotamidae	1	EPT	
			Odonata	Gomphidae	1		S
				Calopterygidae	1		
			Diptera	Athericidae	1		S
				Chironomidae	9		
				Simuliidae	1		
		Crustacea	Decapoda	-	1		
			Isopoda	-	6		
	Annelida	Oligochaeta	-	-	1		

Table 2 (continued).

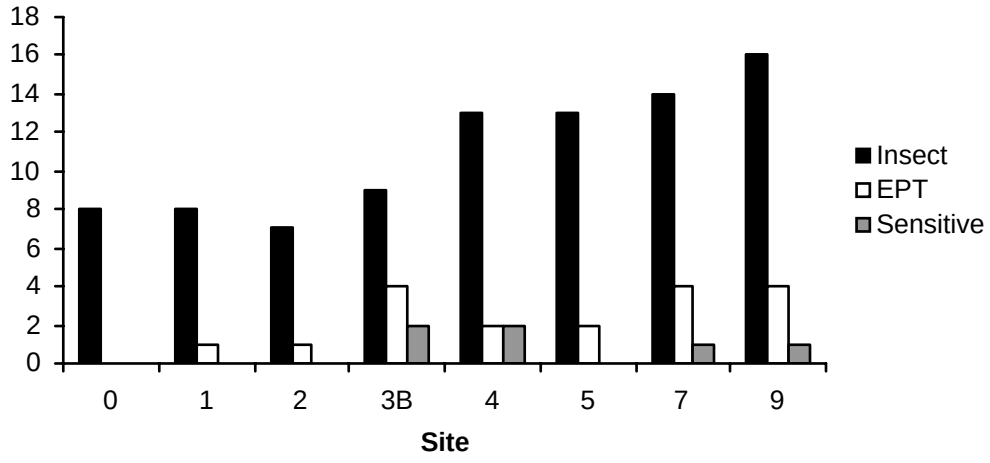
Site	Phylum	Class	Order	Family	Count	EPT	S
4	Arthropoda	Insecta	Hemiptera	Gerridae	2		
			Trichoptera	Brachycentridae	2	EPT	S
				Hydropsychidae	2	EPT	
			Odonata	Aeshnidae	3		
				Gomphidae	1		S
				Calopterygidae	8		
			Coleoptera	Dytiscidae	1		
				Elmidae	7		
				Gyrinidae	1		
				Hydrophilidae	1		
			Diptera	Chironomidae	14		
				Simuliidae	5		
				Tipulidae	1		
		Crustacea	Decapoda	-	1		
			Isopoda	-	13		
			Amphipoda	-	2		
	-	Mollusca	Gastropoda	Physidae	1		
	Annelida	Oligochaeta	-	-	3		
5	Arthropoda	Insecta	Ephemeroptera	Baetidae	2	EPT	
			Hemiptera	Corixidae	2		
				Pleidae	1		
			Trichoptera	Hydropsychidae	1	EPT	
			Odonata	Aeshnidae	1		
				Calopterygidae	1		
			Coleoptera	Dytiscidae	1		
				Elmidae	1		
				Halipidae	1		
				Hydrophilidae	3		
			Diptera	Chironomidae	6		
				Culicidae	2		
				Simuliidae	3		

Table 2 (continued).

Site	Phylum	Class	Order	Family	Count	EPT	S
7	Arthropoda	Insecta	Ephemeroptera	Baetidae	3	EPT	
				Heptageniidae	7	EPT	
			Hemiptera	Corixidae	3		
			Trichoptera	Brachycentridae	2	EPT	S
				Hydropsychidae	25	EPT	
			Odonata	Aeshnidae	2		
				Calopterygidae	6		
			Coleoptera	Dytiscidae	1		
				Elmidae	18		
				Gyrinidae	1		
				Halipidae	1		
				Hydrophilidae	2		
			Diptera	Chironomidae	17		
				Simuliidae	1		
		Crustacea	Isopoda	-	8		
			Amphipoda	-	10		
	-	Mollusca	Gastropoda	Right-handed snail	1		
	-			Physidae	6		
	Annelida	Oligochaeta	-	-	1		
9	Arthropoda	Insecta	Ephemeroptera	Baetidae	11	EPT	
				Heptageniidae	1	EPT	
			Hemiptera	Corixidae	1		
				Gerridae	1		
				Veliidae	3		
			Trichoptera	Brachycentridae	6	EPT	S
				Hydropsychidae	17	EPT	
			Odonata	Calopterygidae	7		
			Coleoptera	Dytiscidae	2		
				Elmidae	10		
				Hydrophilidae	2		
				Psephenidae	2		
			Diptera	Chironomidae	15		
				Simuliidae	5		
				Tipulidae	1		
			Lepidoptera	Pyralidae	1		
		Crustacea	Decapoda	-	1		
			Isopoda	-	15		
	-	Mollusca	Gastropoda	Right-handed snail	4		
	-			Physidae	1		
	-		Pelecypoda	Corbiculidae	2		
	Platyhelminthes	Turbellaria	-	-	1		

The invertebrate samples were analyzed in three ways: number of insect families, number of EPT families, and number of sensitive families. The number of insect families is an indication of the diversity of invertebrates found at the study sites, and a higher number indicates better stream quality. The EPT index refers to the number of families represented in each sample that belonged to the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). These orders have been documented to include families that are sensitive to stream degradation, and their presence and diversity are an indication of good stream quality. Finally, certain families of stream insects, both in and out of the EPT orders, have been identified as particularly sensitive to stream degradation (tolerance ratings of 0-2; Hilsenhoff 1988). Their presence in the samples is an indicator of good stream health. As seen in Figure 1, insect data suggest that stream quality improves as you move from lower numbered sites (upstream) to higher numbered sites (downstream).

Figure 1. Benthic insect families found at each study stream site. Each category is a measure of stream quality.



Conductivity is a measure of general water quality. It increases with the amount of dissolved ions, such as salts or metals. If the average conductivity measured at a site is 800 microSiemens (µS) or less, it is considered natural for stream water in this region. Conductivity over 800 µS may indicate the presence of toxic substances (of course, many toxins are not measured by conductivity). This measure is used as a red flag, signaling a need for further investigation of what is dissolved in the water. All but one the sampled stream sites had conductivities of 805 or lower. However, site 2 measured 1058 µS on the day of sampling, and supported the lowest number of insect families, the lowest number of EPT families, and no sensitive species. These data suggest that site 2 is of relatively poor quality.

Table 3. Stream water conductivity at the study sampling sites.

Site	Conductivity (µS)
0	Not sampled
1	Not sampled
2	1058
3B	805
4	717
5	727
7	781
9	742

References

MDEQ. 2002. Procedure #51: Qualitative biological and habitat survey protocols for wadable streams and rivers. Great Lakes and Environmental Assessment Section, Surface Water Quality Division, Michigan Department of Environmental Quality, Lansing.

Hilsenhoff, W.L. 1988. Rapid field assessment of organic pollution with a family-level biotic index. Journal of the North American Benthological Society 7(1):65-68.

Appendix - Road Stream Crossing Erosion Problems in Stony Creek Watershed

Below are the locations of road stream crossings in Stony Creek Watershed with erosion problems. The code corresponds to the "subwatershed" and crossing number from the road stream crossing survey. All data from the survey is available from MDEQ, including photographs of the problems.

Road Ditches

BMD-6	Talladay/Butler
BMD-11	Bunton S of Talladay
LSC-27	Steffas N of Zink
PCW-6	Rosbalt W of Whittaker
USC-3	Grames E of Townsend
USC-4	Oakville E of Whitaker

Crossing Embankments

BMD-2	Bunton N or Torrey
BMD-9	Bunton/Macey
BMD-15	Macey Rd E of Tuttle Hill
BMD-17	1/2 between Tuttle Hill and Bunton
LSC-8	Mentel Rd S of Nadeau
LSC-23	Fine N of Heiss
LSC-31	Corner of Maybee-Scofield & Main
MSC-12	Martinsville N of Scofield
MSC-21	Doty S of Geirman
MSC-27	Ferder N of Scofield Rd
MSC-29	Hoffman W of Palmer
MSC-33	Corner of Stout and Capernall
PCW-13	Judd E of Whittaker
PCW-15	Willis W of Whittaker
USC-12	Whittaker S of Liss
USC-14	Hitchingham N of Oakville
USC-15	Gooding N of Oakville
USC-16	Sanford N of Train Track
USC-17	Sanford S of Akona
USC-20	Gooding N of Arkona
USC-21	McCrone S of Willow
USC-25	Platt S of Willow
USC-26	Willow E of McCrone
USC-28	Sanford N of Willow
USC-35	Willow E of Gooding
USC-36	McCrone S of Talladay
USC-37	Sanford N of Willow

Road approaches

LSC-13	US 24/S Stony Creek
MSC-20	Sumpter S of Stony Creek
PCW-14	Whittaker N of Judd
PCW-31	Hitchingham N of Merritt
PCW-39	Joe Hall Dr
USC-22	Sanford N of Arkona
USC-31	Judd W of Platt
USC-39	Carpenter N of Judd
USC-41	Talladay E of Hitchingham
USC-48	Stony Creek NE of Carpenter
USC-51	Willis W of Stony Creek

Perched culvert		Amount perched
BMD-19	Liss W of Bunton	< 3 in
BMD-21	Oak E of Tuttle Hill	3-12 in
LSC-13	US 24/S Stony Creek	< 3 in
LSC-36	Raisin S of Scofield	< 3 in
MSC-47	Gramlick S of Grames	< 3 in
USC-29	Carpenter N of Willow	> 12 in

Appendix - Prioritization of Pollutants/Challenges by Watershed Residents

Lower Watershed								Average		SORTED	Prioritization
Altered hydrology	1	2	1	8	1	6	2	3.00	Altered hydrology	3.00	Altered hydrology
Sedimentation/Soil erosion	2	6	2	6	2	5	1	3.43	Sedimentation/Soil erosion	3.43	Sedimentation/Soil erosion
Pesticides	3	3	7	4	5	4	6	4.57	Pesticides	3.71	Low DO
Low DO	4	5	3	3	3	1	7	3.71	Low DO	4.43	Nutrients
Nutrients	5	1	6	9	5	2	3	4.43	Nutrients	4.57	Pesticides
Oil, grease, metal, brine salt	6	4	5	1	5	10	4	5.00	Oil, grease, metal, brine salt	5.00	Oil, grease, metal, brine salt
Pathogens	7	7	7	7	5	7	5	6.43	Pathogens	6.14	Temperature
Temperature	8	8	4	6	5	3	9	6.14	Temperature	6.43	Pathogens
Hydro Sulf/Total Diss Solids	9	8	7	2	4	9	8	6.71	Hydro Sulf/Total Diss Solids	6.71	Hydro Sulf/Total Diss Solids
Low pH	10	8	4	10	5	8	10	7.86	Low pH	7.86	Low pH

Upper Watershed															Average		SORTED	Prioritization
Altered hydrology	4	1	2	1	1	1	1	5	1	3	3	1	5	1	2.14	Altered hydrology	1.79	Sedimentation/Soil erosion
Sedimentation/Soil erosion	1	1	1	2	3	2	2	1	5	1	1	2	1	2	1.79	Sedimentation/Soil erosion	2.14	Altered hydrology
Pesticides	2	1	4	6	3	6.5	3	8	6	7	7	4	7	4	4.89	Pesticides	3.21	Nutrients
Low DO	4	2	4	6	3	6.5	7	2	7	5	2	8	2	4	4.46	Low DO	4.46	Low DO
Nutrients	4	1	4	4	3	3	4	3	2	4	4	3	3	3	3.21	Nutrients	4.89	Pesticides
Oil, grease, metal, brine salt	4	5	4	3	3	6.5	10	6	8	9	6	6	4	4	5.61	Oil, grease, metal, brine salt	5.07	Temperature
Pathogens	3	4	4	5	3	9	8	9	3	8	8	5	7	4	5.71	Pathogens	5.36	Hydro Sulf/Total Diss Solids
Temperature	4	3	4	6	3	4	6	4	4	6	9	7	7	4	5.07	Temperature	5.61	Oil, grease, metal, brine salt
Hydro Sulf/Total Diss Solids	4	2	4	6	2	10	5	7	9	2	5	9	6	4	5.36	Hydro Sulf/Total Diss Solids	5.71	Pathogens
Low pH	4	2	3	6	3	6.5	9	10	10	10	10	10	7	4	6.75	Low pH	6.75	Low pH

RED Numbers were filled in by EMU staff - assumed that pollutants left blank were lower priority than the ones prioritized.

Table 5.1: Recommended Strategies for Water Quality Improvements in the Stony Creek Watershed

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Develop Stony Creek Watershed Council (SCWC)	A-F	Townships, County governments, other Stakeholders	All local and county governments	FTE employee: $40-45,000 annually+benefits	Implementation during year 1	All	HRWC, River Raisin Watershed Council
Developed and Developing Areas							
Conduct Hydrologic Study to refine hydrologic problem areas in system	A-E, principally A	SCWC	contractual	$50,000	Implementation by year 2	Entire watershed	MDEQ, HRWC
Implement Consistent Stormwater Management Standards	A-E, principally A	Townships	All local governments	minimal	Adoption in 2 communities	All, principally areas 1-6, 10	Washtenaw County Drain Commission (WCDC)
Conduct Low Impact Development Roundtable Discussion	A-E	Townships, County governments	All local and county governments	minimal	Convened by year 2	All	HRWC, EMU, WCDC, local LA firms
Establish Site Plan Review Enhancement	A-E	Townships, County Governments	All local and county governments	-----	Adoption in 4 communities	All, principally areas1-6,10	HRWC, EMU
Establish Local Open Space Easement	A-E	Counties, Townships	All local and county governments	Parks millage	Adopted in 2 communities	All, principally areas 1-6,10	Washtenaw Land Trust, County Governments, Farmland and Open Space Preservation Program, AA greenbelt
Establish Natural Features Ordinance	A-E	Townships	Local governments	minimal	Adopted in 2 communities	All, principally areas1-6,10	HRWC
Establish Wetlands Ordinance	A-E	Townships, County governments	Local governments	minimal	Adopted in 2 communities	All, principally areas 1-6,10	HRWC
Construct Bioretention Systems	A-E	Private Landowners, Townships, County governments	depends on opportunities	$6.80/ft3	Adopted in 2 communities, used where appropriate - won't infiltrate in C and D	Monitoring areas 1-6, 10	WCDC, local LA firms

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Developed and Developing Areas (continued)							
Construct Infiltration Systems	A-E	Landowners, Townships, County governments	depends on opportunities	$5/ft^3	Adopted in 2 communities	All, principally areas 1-6	WCDC, local LA firms
Construct & maintain Stormwater Retention/Detention	A-E	Landowners, Townships, County governments	depends on opportunities	$41,600/ acre-ft for 10 year storm, maintenance 3-5% construction costs	Adopted in 2 communities	All, principally areas 1-6	
Construct & maintain Wet Detention Ponds	A-E	Landowners, Townships, County governments	depends on opportunities	$1.30/ft^3, plus 4% construction costs annual mainten.	Adopted in 2 communities	All, principally areas 1-6	
Construct Grassed/Vegetated Swales	A-E	Private Landowners, Townships, County governments	depends on opportunities	$0.50/ft^2 plus $0.02/ft^2/yr maintenance	Adopted in 2 communities	All, principally areas 1-6	WCDC, local LA firms
Disconnect Directly Connected Impervious Areas	A-E, principally A	Townships, Landowners	depends on opportunities	$50/house	Adopted in 2 communities	Monitoring areas 1-6,10	WCDC, HRWC
Municipal Rain Garden	A-E	Ypsilanti Township Public Library	Ypsilanti Township Public Library demonstration site	$3-5/ft2 with volunteer labor	Completed by year 3	Ypsilanti Township Public Library	WCDC, private firms, MDEQ
Residential Rain Gardens	A-E	Private landowners	Areas with appropriate soils	$500/homesite; $3-5/ft^2 or more for professional work	5 homesites by year 4	Monitoring areas 1-6,10	MDEQ
Green roofs	A	Private landowners	1 demonstration site	$12-24 / ft^2	Demonstration site by year 5	Monitoring areas 1-6,10	MDEQ
Alternative Road Specifications for low-traffic roads	A	Townships, County governments	New developments	$2000 plus enforcement	enactment	All, principally areas 1-6,10	HRWC
Soil Erosion and Sedimentation Control Enforcement: Mudbuster Program	B	Washtenaw County Drain Commission	depends on volunteer support level	Minimal	Implemented in year 1	Construction areas of Washtenaw County	Washtenaw County Drain Commission, HRWC
Sand and Organic Filter	B-D	Private landowner, developers	Depends on amount of development	$5/ft^3	Initiated by year 2	Areas undergoing construction	Drain Commissions, HRWC

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Developed and Developing Areas (continued)							
Street Sweeping	B	Local governments, road commissions	Every 1-2 weeks, except during freezes	$15-30 per curb mile	Initiated by year 2	Monitoring areas 1-5,10	County Governments
Golf Course Nutrient Management	C	Private landowners, County Governments	3 golf courses	$7,500 each	Certified members of Michigan Turfgrass Stewardship Program by year 3	Washtenaw County, monitoring areas 1-3	MSU Extension, Drain commissioner
Native Vegetation Restoration Program	A-E	Landowners, County govts, road and drain commissions	where suitable	$600-800/acre, plus $500/acre maintenance	Initiate by year 4	All	MSU Extension, Conservation District, NRCS
Illicit Connection Correction	F	County Drain Commissioner / Health Department	All illicit connections in Stormwater Phase II townships	$450,000	All by 2010	Pittsfield and Ypsilanti townships	Washtenaw County Drain Commissioner / Health Department
Agricultural Areas							
Inventory Agricultural Conservation Practices	B,C	Conservation Districts, local governments	All agricultural areas	$3,500 ($1,750/District)	Initiate in year 1	Agricultural areas, mainly areas 3-9	USDA programs, assistance from NRCS, Conservation Districts.
Riparian Buffer	B,C	Private landowners, local governments, drain and road commissions	7% of watershed acres	$350/acre	25% of stream miles by end of proposed implementation effort.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, Conservation Districts.
Grassed Waterways	B,C	Private landowners	Ag acres X .0075	$3,500/acre w/o tile $4,500/acre w tile	25% of total acres by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, drain commissions
Grade Stabilization Structures	B,C	Private landowners	33 structures	Geotextile: $5-6,000; Fabricated: $8,500 – 9,500/structure	25% implementation by year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, drain commissions
Conservation Cover	B,C	Private landowners	5% of Ag acres	$225/acre	25% of total acres by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, drain commissions

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Agricultural Areas (continued)							
Conservation Crop Rotation with Cover Crop and Mulch/No-till	B,C	Private landowners	15% of Ag acres	Cover crop: $170/acre Mulch/No-Till: $10-15 acre	25% of total acres by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, drain commissions
Nutrient Management	B,C	Private landowners	50% of Ag acres	$10 / acre annually	25% of total acres by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, Conservation Districts.
Waste Storage Facility	C,F	Private landowners	Determined after inventory	$100-250,000 each	Determined after inventory	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, Conservation Districts.
Livestock Use Exclusion	B,C,F	Private landowners	4 miles	$3/ft	Implementation at two locations with animal access to streams by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, Conservation Districts.
Vegetative Filter Strips	B,C	Private landowners	See attachment below.	$200 / acre	25% of total acres by implementation year 3.	Areas 3-9 specifics after inventory	USDA programs, assistance from NRCS, Conservation Districts.
Purchase of Development Rights Ordinances	A	Local Townships	4 townships	$500-1000 per township, $2000-4000 total.	Adopted in 2 communities	Monitoring area 4-6	County Govts, Farmland and Open Space Preservation Program
Ash Tree Removal and Restoration in floodplains.	A, B	Local Townships	Removal of all trees threatening to fall into stream with replacement for bank stability	$200-1000 per tree removed. Up to $20,000 per community grants for restoration	Adopted in 2 communities.	Monitoring areas 4-9	MDNR Restoration Plantings Grants, Wood disposal: Michigan Dept. of Agriculture

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Stream Channels and Roadways							
Road/Bridge Surface Stabilization	B	Road commissions	11 sites		Repair priority sites by year 5.	See chart	MDOT, Road commissions
Soil Stabilization at Road Crossing Embankments	B	Road commissions	27 sites		Repair priority sites by year 5.	See chart	MDOT, Road commissions
Culvert Replacements	A-B	Road commissions	6 sites		Determined after hydrologic study	See chart	MDOT, Road commissions
Bank Restabilization	B	Landowners, local governments, drain & road commissions	2 miles of stream in watershed	$90/ft, $1.80/ft annual maintenance	Determined after hydrologic study	Where needed, primarily areas 4,5,6	MDEQ, Drain Commissions
Implement Alternative Drain Practices and Rehab	A	County governments	All designated drains	variable, depending on practice	Change of practice in 10% of designated drains by year 5.	All designated drains	US EPA, Trout Unlimited, MDNR, Nature Conservancy
Ash Tree Removal and Restoration in floodplains.	A, B	Local Townships	Removal of all trees threatening to fall into stream with replacement for bank stability	$200-1000 per tree removed. Up to $20,000 per community grants for restoration	Adopted in 2 communities.	Monitoring areas 4-9	MDNR Restoration Plantings Grants, Wood disposal: Michigan Dept. of Agriculture
Educational Outreach and Stewardship							
I&E: Yard care, native landscaping, encourage soil testing	C	SCWC, townships	all households	Materials available. Printing and mailing $1 per household	50% households by year 2, 100% by year 3	Monitoring areas 1-5,10, unless Phase II required	HRWC, MSU-Extension
I&E: Septic System Maintenance	C,F	SCWC, townships	all households	”	50% households by year 2, 100% by year 3	Monitoring areas 7-9, unless Phase II required	HRWC, MSU-Extension
I&E: Vehicle Maintenance and oil disposal	D	SCWC, townships	all households	”	50% households by year 2, 100% by year 3	All, primary areas 1-2, unless Phase II required	HRWC, MSU-Extension
I&E: Disconnect directly connected impervious areas	A	SCWC, townships	all households	"	50% households by year 2, 100% by year 3	areas 1-2,10, unless Phase II required	HRWC, MSU-Extension

Recommended Strategy	Problem addressed	Responsible	Level of effort	Cost Estimate	Measure of Success	Locations	Resources
Monitoring and Evaluation							
Monitor Water Quality	A-F	SCWC, MDEQ, MDNR, Townships, County Governments	dry and wet weather monitoring; seasonal variation	$50,000	Initiate by year 4	All	MDEQ, MDNR
Monitor Macroinvertebrate Diversity / Develop Evaluation Model like HRWC Program	A-F	SCWC	8 sites to start, add as volunteer support increases, 2 times/year	$50,000 for model plus $20,000/ year	Initiate by year 2, Amount of Volunteer participation	8 sites from Summer 2004 study, add new sites on tributaries	HRWC
Hydrologic Monitoring	A-B	SCWC	Dry and wet weather monitoring, concentrated in upper watershed where altered hydrology and bank erosion most severe.	$10,000 for equipment, plus $20,000 year	Initiate 1 year after completion of hydrologic study	All	HRWC, MDEQ. MDNR

Recommended Strategy	**Level of Effort**
Vegetated Filter Strips	Calculate as follows: 1. Stream length X % Ag acres 2. #1 X 2 (for both sides of stream) 3. #2 X (% of stream length still needing treatment)* 4. #3 X 30 (avg. width of strips in feet) 5. #4 divided by 43,560 (to convert feet to acres)

* = For Mill Creek, this figure was 1.3% of the Ag acres. It was estimated by looking at aerial photos and calculating the amount of untreated stream length in several representative areas, then extrapolating this calculation across the entire Ag area.

Table 6.1 Information and Education Tasks for the Stony Creek Watershed

Delivery Mechanism	Topic	Tasks	Responsible Organization	Help	Evaluation	Timeline	Cost per household	Comments on Cost Estimates	Annual Cost per 200,000 households
Publicity									
WEMU - FM	watershed awareness and BMPs	radio interviews	Stony Creek Watershed Council		number of airings	once per year	none		none
Cable	watershed awareness and BMPs	run Kevin Frank's DVD	Stony Creek Watershed Council	Kevin Frank	number of airings	periodic in spring	$ 0.0001	for DVD copying	$20.00
Newsprint	watershed awareness and BMPs	articles on watershed	Stony Creek Watershed Council		placements	twice per year	none		none
Newsletters	watershed awareness and BMPs	articles and ads	Stony Creek Watershed Council		placements	quarterly opportunity	none		none
Direct Mail									
Tip Cards	auto, lawn and storm drain	design, print, mail	Stony Creek Watershed Council	HRWC	include coupon, track redemptions - aim for 2%	Once/year: mail dates: lawncare = March automotive = June storm drain = July	$ 0.50	setting, printing and mailing included, plus $1,000 for prof. Designer	$101,000.00[1]
Calendar	12 nonpoint topics, plus resources	design, print, mail	Stony Creek Watershed Council	HRWC	include evaluation form with the calendar	Mail in October	$ 0.75	setting, printing and mailing included, plus $1,500 for prof. Designer	$151,500.00[2]
Riparian Brochure	streamside management	design, print, mail	Stony Creek Watershed Council		number sent	spring	$ 0.20	printing and mailing included, plus $300 for prof. Designer	$40,300.00[3]
Hand outs									
Septic Tip Card	septic maintenance	design, print	Stony Creek Watershed Council	HRWC	distribute via realtors, check with them for results	periodic delivery - print for realtors at start of grant.	$ 0.05	cost per card, est. 2,500 for first run (confirm w/septic distribution) - design in-house	$125.00

Delivery Mechanism	Topic	Tasks	Responsible Organization	Resources	Evaluation	Timeline	Cost per household	Comments on Cost Estimates	Annual Cost per 200,000 households
Agricultural Tip Cards	Agricultural conservation practices	design, print	Stony Creek Watershed Council	HRWC, MSU-ext.	distribute at County Fairs	once each year	$ 0.05	cost per card, est. 2,500 for first run	$125.00
Paid Print Advertisements									
Ypsilanti Press	auto, lawn and storm drain	design, place	Stony Creek Watershed Council	HRWC	include phone number, track number of calls	same timing as tip cards	$ 0.10	per year, covers ad placement and design/output	$20,000.00
Ypsilanti Courier	auto, lawn and storm drain	design, place	Stony Creek Watershed Council	HRWC	include phone number, track number of calls	same timing as tip cards	$ 0.025	per year, covers ad placement and design/output	$5,000.00
Promote Soil Testing									
Print Ads	soil testing promotion	design, place	Stony Creek Watershed Council	HRWC MSU-ext.	increase in tests submitted for the region	promotion annual: last wk in March, 1st 2 wks in April	$ 0.025	per year, covers ad placement and design/output	$5,000.00
Flyers	soil testing promotion	design, print, distribute to participating retailers	Stony Creek Watershed Council	HRWC MSU-ext.	increase in tests		$ 0.00075	funds for MSU extension flyers for 2 stores	$150.00
Staff time estimates: 5 hrs/wk $32.50 x 260 hrs								$32.50 x 260 hours =	$8,450.00
								TOTAL =	$331,670.00

1 - Price reduction by mailing all tip cards together, including riparian living tip card.
2 - Price can be reduced via paper stock and mail weights for calendar.
3 - Combine riparian living card with other tip cards to reduce cost, or go as self- mailed postcard style.